Complete Summary

GUIDELINE TITLE

APIC guideline for selection and use of disinfectants.

BIBLIOGRAPHIC SOURCE(S)

Association for Professionals in Infection Control and Epidemiology, Inc. APIC guideline for selection and use of disinfectants. Am J Infect Control 1996 Aug;24(4):313-42. [294 references] PubMed

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Nosocomial infection

GUIDELINE CATEGORY

Evaluation
Prevention

CLINICAL SPECIALTY

Infectious Diseases
Internal Medicine
Preventive Medicine

INTENDED USERS

Allied Health Personnel
Clinical Laboratory Personnel
Dentists
Health Care Providers

Hospitals
Nurses
Physicians

GUIDELINE OBJECTIVE(S)

To assist health care professionals in their decisions involving the judicious selection and proper use of specific disinfectants

TARGET POPULATION

Health care personnel

INTERVENTIONS AND PRACTICES CONSIDERED

1. Sterilization of critical items, using heat sterilization (including steam or hot air), ethylene oxide gas, glutaraldehyde-based formulations, stabilized hydrogen peroxide, and peracetic acid.
2. Disinfection of semi-critical and non-critical items, using glutaraldehyde-based formulations, stabilized hydrogen peroxide, peracetic acid, wet pasteurization, sodium hypochlorite, ethyl or isopropyl alcohol, sodium hypochlorite, phenolic germicidal detergent solution, iodophor germicidal detergent solution, and quaternary ammonium germicidal detergent solution.

MAJOR OUTCOMES CONSIDERED

Not stated

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Initial drafts were reviewed by the Association for Professionals in Infection Control and Epidemiology (APIC) Guidelines Committee, key individuals, and professional organizations before the publication of the draft document in the August 1995 Issue of the American Journal of Infection Control, soliciting further comments. All written comments were reviewed by the APIC guidelines Committee and revisions were made. The Guideline was finalized by the Committee in Feb 1996 and approved by the APIC Board of Directors in March 1996.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

A. Cleaning, disinfecting, and sterilizing patient care equipment: All objects to be high-level disinfected or sterilized should first be thoroughly cleaned to remove all organic matter (e.g., blood, tissue) and other residue.
B. Indications for sterilization and high-level disinfection (recommendations B.1. and B.4. per 1985 Centers for Disease Control and Prevention (CDC) guideline (Garner & Favero, 1986) and recommendation B.5 per 1993 CDC guideline) (Centers for Disease Control and Prevention, 1993).

1. Critical medical devices or pieces of patient care equipment that enter normally sterile tissue or the vascular system or through which blood flows should be sterilized before each use.
2. Endoscope accessories: Biopsy forceps or other cutting instruments that break the mucosal barrier should be sterilized. Other endoscope accessories (e.g., suction valves) should be sterilized after each patient use; if this is not feasible, they should receive at least high-level disinfection. For additional recommendations, please refer to the National Guideline Clearinghouse (NGC) summary for the guideline titled "APIC Guideline for Infection and Control in Flexible Endoscopy". (Martin & Reichelderfer, 1994)
3. Laparoscopes, arthroscopes, and other scopes that enter normally sterile tissue should be subjected to a sterilization procedure before each use; if this is not feasible, they should receive at least high-level disinfection. Disinfection should be followed by a rinse with sterile water.
4. Equipment that touches mucous membranes (e.g., endoscopes, endotrachael tubes, anesthesia breathing circuits and respiratory therapy equipment) should receive high-level disinfection.
5. Dental instruments that penetrate soft tissue or bone (e.g., forceps, scalpels, bone chisels, scalers, and burs) are classified as critical and should be sterilized or discarded after each use. Dental instruments that are not intended to penetrate oral soft tissue or bone (e.g., amalgam condensers, air-water syringes) but may come into contact with oral tissues are classified as semicritical and should be sterilized after each use. If the semicritical instrument could be damaged by the sterilization process, the instrument should be high-level disinfected. Noncritical surfaces, such as uncovered operatory surfaces (e.g., countertops, chair switches), should be disinfected between patients as intermediate level or low-level disinfectant.

C. Chemical methods for sterilization: When sterilization is indicated and other sterilization methods (e.g., steam or ethylene oxide gas [ETO]) cannot be used, any one of three liquid chemical sterilants [glutaraldehyde-based formulations (2%), stabilized hydrogen peroxide (6%), or peracetic acid (concentration variable but $\leq$ 1% is sporicidal)] may be used. The manufacturer's instruction for use will specify the recommended exposure time.

D. Selection and use of high-level disinfectants for semicritical patient care items.
    1. Solutions containing glutaraldehyde (2%), hydrogen peroxide (6%), chlorine (5.2% household bleach), and peracetic acid (concentration variable but $\leq$ 1% is sporicidal) can achieve high-level disinfection if objects are properly cleaned before disinfection. The disinfectant or chemical sterilant selected should have no minimal deleterious effects on the object (e.g., chlorine may corrode metals).
    2. The exact time for disinfecting semicritical items is somewhat elusive at present because of conflicting label claims and lack of agreement in published literature, especially regarding the mycobactericidal activity of glutaraldehydes. The longer the exposure of an item to a disinfectant, the more likely it is that all contaminating microorganisms will be inactivated. Unfortunately, with extended exposure to a disinfectant it is also more likely that delicate and intricate instruments such as endoscopes may be damaged. Medical equipment such as

endoscopes, which are difficult to clean and disinfect because of narrow channels or other areas that can harbor organisms (e.g., crevices, joints), should be exposed to a high-level disinfectant for at least 20 minutes at room temperature after cleaning.

E. Selection and use of low-level disinfectants for noncritical patient care items.
    1. Solutions for use on noncritical patient care equipment and concentrations are:
        - ethyl or isopropyl alcohol (70% to 90%)
        - sodium hypochlorite (5.2% household bleach) 1:500 dilution (100 ppm free choline)
        - phenolic germicidal detergent solution (follow product label for use-dilution)
        - iodophor germicidal detergent solution (follow product label for use-dilution)
        - quaternary ammonium germicidal detergent solution (follow product label for use-dilution)
    2. The contact time is 10 minutes or less.
    3. Phenolics should not be used to clean infant bassinets and incubators during the stay of the infant. If phenolics are used to terminally clean infant bassinets and incubators, the surfaces should be rinsed thoroughly with water and dried before the infant bassinets and incubators are reused.

F. Processing patient care equipment contaminated with human immunodeficiency virus (HIV) or hepatitis B virus (HBV).
    1. Standard sterilization and disinfection procedures for patient care equipment (as recommended in this guideline) are adequate to sterilize or disinfect instruments or devices contaminated with blood or other body fluids from persons infected with blood-borne pathogens, including HIV. No changes in procedures for cleaning, disinfecting, or sterilizing need to be made.
    2. Noncritical environmental surfaces contaminated with blood or bloody body fluids should be cleaned before an Environmental Protection Agency (EPA)-registered disinfectant/detergent is applied for disinfection. Persons cleaning spills should wear disposable gloves and other personal protective equipment as indicated.

G. Processing Creutzfeldt-Jakob disease (CJD)-contaminated patient care equipment.
    1. The only infectious agent that requires unique decontamination recommendations is the CJD prion. The need for such recommendations is due to an extremely resistant subpopulation of prions and the protection afforded this tissue-associated agent.
    2. Critical and semicritical CJD-contaminated care equipment should preferably be steam sterilized for at least 30 minutes at a temperature of 132Â° C (121Â° C is not effective) in a gravity displacement sterilizer. A prevacuum sterilizer used for 18 minutes at 134Â° C to 138Â° C has also been found to be effective. Immersion in 1 N sodium hydroxide (which is caustic) for 1 hour at room temperature followed by steam sterilization at 121Â° C for 30 minutes is an alternative procedure for critical and semicritical items. Because noncritical patient care items or surfaces (e.g., autopsy tables, floors) have not been involved in disease transmission, these surfaces may be disinfected with either bleach (undiluted, or up to 1:10 dilution) or 1 N sodium hydroxide at room temperature for 15 minutes or less. A formalin-

formic acid procedure is required for inactivating virus infectivity in tissue samples from patients with CJD.

H. Method of processing reusable transducers: After transducers are cleaned, they may be sterilized with ETO or disinfected with a high-level disinfectant. Alternatively, transducer heads may be disinfected with 70% isopropyl alcohol. However, the disinfection procedure must be adhered to rigorously, and this is best accomplished in a controlled setting. The transducers should be stored in a manner to prevent recontamination before use.

I. The selection and use of disinfectants in the health care field is dynamic, and products may become available that were not in existence when this guideline was written. As newer disinfectants become available, persons or committees responsible for selecting disinfectants should be guided by information in the scientific literature.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Selection of appropriate disinfectants and optimal use with medical devices
- Reduced infectious complications of healthcare procedures

POTENTIAL HARMS

General health hazards associated with the use of germicides in health care:

- Mucous membrane irritation
- Death (via accidental ingestion by mentally disturbed patients)

Potential harms for chemical disinfection:

- The toxic side effects for the patient caused by chemical residues on the instrument or object
- Occupational skin disease among cleaning personnel due to toxic exposure

Specific harms of disinfectants:

- Alcohol: Use of alcohol on tonometer tips has been reported to result in corneal opacification.
- Chlorine and chlorine compounds: A potential hazard is the production of the carcinogen bis-chloromethyl ether when hypochlorite solutions come into contact with formaldehyde. A mixture of sodium hypochlorite with acid will also produce a rapid evolution of toxic chlorine gas.
- Glutaraldehyde: is irritating to the eyes, throat and nose. Epistaxis, allergic contact dermatitis, asthma, and rhinitis have also been reported in health care workers exposed to glutaraldehyde.
- Hydrogen peroxide: Corneal damage from a hydrogen peroxide-disinfected tonometer tip that was not properly rinsed has been reported. Chemical irritation resembling pseudomembranous colitis, caused by either 3% hydrogen peroxide or a 2% glutaraldehyde, has been infrequently reported.
- Phenolics: Phenolics are assimilated by porous materials, and the residual disinfectant can cause tissue irritation. The use of phenolics in nurseries has been justifiably questioned because of the occurrence of hyperbilirubinemia in infants placed in nurseries that use phenolic detergents.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Association for Professionals in Infection Control and Epidemiology, Inc. APIC guideline for selection and use of disinfectants. Am J Infect Control 1996 Aug;24(4):313-42. [294 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1996 Aug (reviewed 2001)

GUIDELINE DEVELOPER(S)

Association for Professionals in Infection Control and Epidemiology, Inc. - Professional Association

SOURCE(S) OF FUNDING

Johnson & Johnson Medical, Inc.

GUIDELINE COMMITTEE

Association for Professionals in Infection Control and Epidemiology (APIC) Guidelines Committee

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Author: William A. Rutala, PhD, MPH, CIC.

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

American Journal of Infection Control (AJIC) wishes to assure readers that Johnson & Johnson Medical, Inc. had no involvement in the development of this Association for Professionals in Infection Control and Epidemiology, Inc. (APIC) guideline, exercised no editorial control over the Guideline, and neither APIC nor any author received financial renumeration Johnson & Johnson Medical, Inc. for working on the guideline.

GUIDELINE STATUS

This is the current release of the guideline. This guideline replaces previously published "APIC guideline for selection and use of disinfectants" (Am J Infect Control. 1990 Apr;18(2):99-117).

According to the guideline developer, this updated guideline has been reviewed. This review involved updated literature searches of electronic databases and expert panel review of new evidence that has emerged relative to the recommendations presented in this guideline. The guideline developer asserts that this guideline is current as of Dec 2001.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Association for Professionals in Infection Control and Epidemiology, Inc. Web site.

Print copies: Available for purchase from the Association for Professionals in Infection Control and Epidemiology, Inc., 1275 K Street, NW, Suite 1000,

Washington, DC 20005-4006. For more information, please see the Association for Professionals in Infection Control and Epidemiology, Inc. Web site.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 2, 2000. The guideline developer was provided with a copy of this NGC summary for review, but to date, NGC has not received any comments from the guideline developer.

COPYRIGHT STATEMENT

Date Modified: 11/8/2004